

## CLAIMS

The subject matter claimed is:

1. A method for enhancing *in situ* bioremediation of a nonaqueous halogenated solvent in ground water comprising adding to the ground water an amount of an electron donor  
5 sufficient for a halo-respiring microbe in the ground water to use the nonaqueous halogenated solvent as an electron acceptor, thereby reductively dehalogenating the nonaqueous halogenated solvent into innocuous compounds, wherein said electron donor comprises oleyl lactic acid, linoleyl lactic acid, linolenoyl lactic acid, stearoyl lactic acid, palmitoyl lactic acid, myristoyl lactic acid, lauroyl lactic acid, caproyl lactic acid, or mixtures thereof.
- 10 2. The method of claim 1 wherein said electron donor further comprises a fatty acid, a salt thereof, or a mixture thereof.
3. The method of claim 2 wherein said electron donor further comprises lactic acid, a salt thereof, or a mixture thereof.
4. The method of claim 1 wherein said electron donor further comprises lactic acid, a  
15 salt thereof, or a mixture thereof.
5. A method for enhancing *in situ* bioremediation of a nonaqueous halogenated solvent in ground water comprising adding to the ground water an amount of an electron donor sufficient for a halo-respiring microbe in the ground water to use the nonaqueous halogenated

solvent as an electron acceptor, thereby reductively dehalogenating the nonaqueous halogenated solvent into innocuous compounds, wherein said electron donor comprises oleyl lactic acid.

6. The method of claim 5 wherein said electron donor further comprises a fatty acid, a salt thereof, or a mixture thereof.

5 7. The method of claim 6 wherein said fatty acid comprises oleic acid, a salt thereof, or a mixture thereof.

8. The method of claim 5 wherein said electron donor further comprises lactic acid, a salt thereof, or a mixture thereof.

10 9. The method of claim 6 wherein said electron donor further comprises lactic acid, a salt thereof, or a mixture thereof.

10. The method of claim 7 wherein said electron donor further comprises lactic acid, a salt thereof, or a mixture thereof.

11. A method for enhancing bioremediation of a nonaqueous chlorinated solvent in ground water comprising adding to the ground water an amount of an electron donor sufficient  
15 for a chloro-respiring microbe to use the nonaqueous chlorinated solvent as an electron acceptor, thus reductively dechlorinating the nonaqueous chlorinated solvent into innocuous compounds,

wherein said electron donor comprises oleyl lactic acid, linoleyl lactic acid, linolenoyl lactic acid, stearoyl lactic acid, palmitoyl lactic acid, myristoyl lactic acid, lauroyl lactic acid, caproyl lactic acid, or mixtures thereof.

12. The method of claim 11 wherein said electron donor further comprises a fatty acid, a salt thereof, or a mixture thereof.

13. The method of claim 12 wherein said electron donor further comprises lactic acid, a salt thereof, or a mixture thereof.

14. The method of claim 11 wherein said electron donor further comprises lactic acid, a salt thereof, or a mixture thereof.

15. A method for enhancing bioremediation of a nonaqueous chlorinated solvent in ground water comprising adding to the ground water an amount of an electron donor sufficient for a chloro-respiring microbe to use the nonaqueous chlorinated solvent as an electron acceptor, thus reductively dechlorinating the nonaqueous chlorinated solvent into innocuous compounds, wherein said electron donor comprises oleyl lactic acid.

16. The method of claim 15 wherein said electron donor further comprises a fatty acid, a salt thereof, or a mixture thereof.

17. The method of claim 16 wherein said fatty acid comprises oleic acid, a salt thereof, or a mixture thereof.

18. The method of claim 15 wherein said electron donor further comprises lactic acid, a salt thereof, or a mixture thereof.

5 19. The method of claim 16 wherein said electron donor further comprises lactic acid, a salt thereof, or a mixture thereof.

20. The method of claim 17 wherein said electron donor further comprises lactic acid, a salt thereof, or a mixture thereof.

10 21. A method for enhancing mass transfer of a nonaqueous halogenated solvent present in a nonaqueous residual source of contamination in ground water, said ground water comprising an aqueous phase, into said aqueous phase comprising adding to said ground water an effective amount of a composition that donates electrons for microbe-mediated reductive dehalogenation of said nonaqueous halogenated solvent into innocuous compounds and functions as a surfactant or co-solvent for solubilizing said nonaqueous halogenated solvent, wherein said  
15 composition comprises oleyl lactic acid, linoleyl lactic acid, linolenoyl lactic acid, stearoyl lactic acid, palmitoyl lactic acid, myristoyl lactic acid, lauroyl lactic acid, caproyl lactic acid, or mixtures thereof.

22. The method of claim 21 wherein said composition further comprises a fatty acid, a salt thereof, or a mixture thereof.

23. The method of claim 22 wherein said composition further comprises lactic acid, a salt thereof, or a mixture thereof.

5 24. The method of claim 21 wherein said composition further comprises lactic acid, a salt thereof, or a mixture thereof.

25. A method for enhancing mass transfer of a nonaqueous halogenated solvent present in a nonaqueous residual source of contamination in ground water, said ground water comprising an aqueous phase, into said aqueous phase comprising adding to said ground water an effective amount of a composition that donates electrons for microbe-mediated reductive dehalogenation of said nonaqueous halogenated solvent into innocuous compounds and functions as a surfactant or co-solvent for solubilizing said nonaqueous halogenated solvent, wherein said composition comprises oleyl lactic acid.

15 26. The method of claim 25 wherein said composition further comprises a fatty acid, a salt thereof, or a mixture thereof.

27. The method of claim 26 wherein said fatty acid comprises oleic acid, a salt thereof, or a mixture thereof.

28. The method of claim 25 wherein said composition further comprises lactic acid, a salt thereof, or a mixture thereof.

29. The method of claim 26 wherein said composition further comprises lactic acid, a salt thereof, or a mixture thereof.

5 20. The method of claim 27 wherein said composition further comprises lactic acid, a salt thereof, or a mixture thereof.